# ATTACHMENT C

## UPLAND SOIL MANAGEMENT PLAN

Oregon
Kate Brown, Governor

**Department of Environmental Quality**
**Northwest Region Portland Office**
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May 26, 2015

Drew Gilpin
Manager, Environment & Utilities
Evraz Oregon Steel (EOS)
PO Box 2760
Portland, OR 97208

Re: Evraz Oregon Steel
Shoreline Soil Reuse Plan

Dear Mr. Gilpin:

Thank you for providing the *Riverbank Source Control Measure Soil Reuse Plan, Evraz Oregon Steel* (May 20, 2015). We approve of the plan but note the following:

1. The following values in Table 1 are incorrect; however, they do not impact the evaluation of reuse options:
    a. The site-specific upland subsurface soil value for PCBs should be 4.4 mg/kg as it is not affected by the site specific soil ingestion rate.
    b. The DEQ generic upland surface soil RBC for copper is 41,000 mg/kg.
    c. The DEQ generic upland surface soil RBC for manganese is 23,000 mg/kg.
    d. TPH-diesel should be added to the table with a screening criteria of 4,600 mg/kg as indicated in the text of the document.

2. Figure 3 indicates that sample S-47d contained PCB concentrations that exceeded surface reuse criteria. Table 2 indicates that the surface sample in this location contained PCBs at 0.44 mg/kg, which is below the surface criteria; and the sample collected at 3 feet below surface, S-47d-3, contained PCBs at 0.88 mg/kg, slightly exceeding the surface criteria.

3. Figure 5 indicates that there is an approximately 120-foot segment of the beach between Stations 13+90 and 12+70 from which excavated material will be placed in the east landfill area. There appears to be limited sampling data in this area and the portion of the beach just south of this segment has some of the highest concentrations of PCB detected in the beach. If capacity of the mold basement is limited, it may be more appropriate to place material from the S-46 to S-55 section of the beach in the landfill and place material from this segment in the mold basement.

If you have any questions, please contact me at 503-229-6148.

Sincerely,

Jennifer Sutter, Project Manager
Northwest Region Cleanup and Tanks Section

Cc: ECSI # 141 File
Linda Baker, Integral Consulting
Craig Heimbucher, Integral Consulting
Sean Sheldrake, EPA Region 10
Mike Poulsen, Cleanup/NWR-DEQ
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Integral Consulting Inc.

# MEMORANDUM

| | |
|---|---|
| **To:** | Jennifer Sutter, Oregon Department of Environmental Quality |
| **From:** | Craig Heimbucher, Integral Consulting Inc. |
| **Cc:** | Drew Gilpin and Debbie Deetz-Silva, EVRAZ Oregon Steel<br>Linda Baker – Integral Consulting Inc.<br>Mike Byers – CRETE Consulting |
| **Date:** | May 20, 2015 |
| **Subject:** | EVRAZ Oregon Steel Riverbank Source Control Measure Soil Reuse Plan |
| **Project No.:** | C1144-0640 |

## INTRODUCTION

EVRAZ Oregon Steel (EOS) is implementing a source control measure (SCM) to remove and stabilize contaminants in the riverbank and adjacent upper beach at its Rivergate facility in Portland, Oregon. EOS is planning to reuse berm and beach soil with low polychlorinated biphenyl (PCB) and metals concentrations, permanently placing the soil in two upland fill areas. The approach for reuse of berm and beach soil in upland mill areas was identified in the February 17, 2015, design report for the SCM (Integral and Crete 2015). This memorandum discusses the final reuse plan based on the design report, agency comments in its conditional approval of the design report,[1] and subsequent discussions with the Oregon Department of Environmental Quality (DEQ).

The two areas for berm and beach soil reuse are the concrete-lined mold basement in the former melt shop (mold basement) and along the north side of the east landfill (landfill veneer; Figure 1). In these upland portions of the mill, terrestrial ecological risks are insignificant and there is no potential for direct erosion into the Willamette River. With regard to human health risks, soils for reuse are below or slightly above subsurface reuse criteria and will be capped and managed with long-term management controls.

[1] EVRAZ Oregon Steel shoreline final design letter from DEQ to EOS, dated March 2, 2015

As identified in the design report, the bank material with higher PCB concentrations (the slag soil fill layer) and the southern bank removal soil will be disposed off-site at a Subtitle D landfill.

This soil reuse plan:

- Provides information on the soil planned for reuse, including its locations, chemistry, and volumes
- Summarizes the upland soil reuse criteria identified in the design, the berm and beach soil chemistry, and reuse volumes
- Documents reuse locations, designs, and planned controls.

## BACKGROUND

The majority of the riverbank is vertically defined by three distinct units that lie between 9.6 and approximately 38 ft National Geodetic Vertical Datum of 1929 (NGVD29) (Figure 2):

- The upper beach, between 9.6 and 15 ft NGVD29, consists of material with grain sizes that vary from silty sand to sandy gravel to cobbles and boulders. This unit extends underneath the bank face below the slag/soil fill layer and includes silt, sand and gravel as well as loose and consolidated slag on the surface of the beach in some locations.
- The riverbank forms a steep face between the beach and the berm. The riverbank is composed of a slag/soil layer of fill and generally lies between 15 and 27 ft NGVD29. As indicated above, the slag/soil fill layer of the riverbank will be disposed of off-site at a Subtitle D landfill.
- The berm is an approximately 5- to 10-ft tall ridge that runs parallel to the shoreline and is positioned above the elevation of the steel mill and on top of the near-vertical face of the riverbank, on top of the slag/soil fill layer. The berm is a distinct fill unit that was placed approximately a decade after placement of the slag/soil fill.

Near the north end of the project area, the configuration of the riverbank and upper beach is different. The upper beach extends landward to approximately 22 ft NGVD29. The steep bank face is not present and material between approximately 22 and 25 ft NGVD29 includes vegetation and soil; the slag/soil fill layer is not present. This area is referred to as the northern alcove in the design report. Based on similar physical characteristics and chemical testing results, material planned for excavation from the northern alcove is included with upper beach material in this memorandum.

## SOIL REUSE CRITERIA

The design report identifies PCBs and metals criteria for upland surface and subsurface soil reuse based on site-specific human health risk-based concentrations (RBCs) and background (AECOM and Integral 2014). Per the final design, soil meeting subsurface criteria could be placed in the upland at a depth of 1 ft below final grade in relatively flat areas not subject to erosion.

In its conditional approval of the final design, DEQ indicated that the soil reuse criteria in the design report should also consider protective levels for other potential future industrial site uses that may not reflect current exposure parameters.[2] Site-specific and DEQ generic RBCs for reuse as upland soil and the basis for these values are provided in Table 1.

DEQ indicated that it may approve placement of material with higher concentrations on a case-by-case basis and such reuse areas will be subject to long-term management controls. As discussed further below, the soil reuse will include subsurface placement of some soil with concentrations slightly higher than the subsurface soil reuse criteria. These areas will be capped or covered with soil meeting the DEQ RBCs and site-specific criteria for surface soil and will be subject to long-term management controls.

DEQ also indicated that material should also be screened for diesel petroleum, which has an RBC for construction workers of 4,600 mg/kg. DEQ has agreed that this screening can initially be based on visual criteria. If there is visual or olfactory evidence of petroleum contamination, soil could be tested to assess consistency with reuse criteria.

## SOIL CHEMISTRY AND LOCATIONS PLANNED FOR REUSE

Between 2003 and 2015, extensive soil sampling was completed to characterize the nature and extent of PCBs and metals in beach and berm material. Data were collected during the following investigations:

- *Phase I Remedial Investigation* (Exponent 2004a)
- *Phase IIA Remedial Investigation* (Exponent 2004b)
- *Riverbank Source Control Evaluation* (RETEC 2006)
- *Southern Riverbank Additional Characterization of Soils Report* (AECOM 2009)

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[2] DEQ generic RBCs for occupational and construction workers:
http://www.deq.state.or.us/lq/pubs/docs/RBDMTable.pdf

- *Revised EOS Additional Riverbank and Upper Beach Soil Sampling Report* (AECOM 2011)
- *Data Report for Berm, Upper Beach, and North Alcove Soil Sampling, EVRAZ Oregon Steel* (Integral 2015).

The soil reuse approach outlined below is based on sampling results from these studies.

## Berm

The plan for berm soil reuse is based on sampling data collected during October 2014. This characterization of the berm was conducted by dividing it into four decision units (DUs) and sampling using an incremental sampling method (ISM). A total of 30 sampling increments were collected from each of the four berm decision units (BDU-1 through BDU-4; Figure 3).

Soil sample results from BDU-2, BDU-3, and BDU-4 are less than the site-specific and DEQ generic RBC upland surface soil reuse criteria for PCBs and metals and are suitable for reuse as surface or subsurface fill (Table 2; Figure 3). The final design for the SCM does not include soil removal from BDU-1.

## Beach

Beach soil sampling data evaluated for upland reuse were collected during 2003, 2005, 2009, and 2014 sampling events. All pre-2014 sampling data were collected as surface and subsurface grab samples. Beach and northern alcove samples from the October 2014 event were collected as four-point composite samples from each decision unit (Figure 3). Depth of excavation for each beach decision unit is described in the design report (Integral and Crete 2015) and shown on Figure 3. A total of 63 samples have been collected from the beach and northern alcove in the planned excavation areas, including 42 grab samples and 21 four-point composite samples.

An additional 10 grab samples were collected in 2003 and 2005 from beach soils beneath the slag/soil fill layer of the riverbank (Figure 4). Samples were collected by digging a hole with an excavator bucket and collecting soil from depths generally 1 to 3 ft below the contact between the slag-soil fill and the beach, with one sample at 4 ft below the contact. In general, a distinct break between the slag/soil fill and the underlying alluvial material was observed (RETEC 2006).

Of the 63 beach and northern alcove soil samples collected from the planned excavation areas, 56 are below the surface and subsurface upland site-specific reuse criteria for total

PCBs (Table 2; Figure 3). Six samples exceed the PCB upland surface reuse criteria but are below the upland subsurface reuse criteria. Two surface samples (RB4b, S-48d-S) slightly exceed the PCB upland subsurface reuse criteria. Sample RB4b, collected in 2002, is 1.1 times the site-specific subsurface criteria. Four subsequent samples were collected in the same vicinity, including two composite samples collected in 2014. All four of the subsequent nearby samples are below the subsurface reuse criteria for PCBs. The PCB concentration in the surface sample at location S-48d is 1.1 times the site-specific subsurface reuse criteria, and concentrations in the two deeper samples at the same location, collected at depths of 1.5 and 3 ft below ground surface, are below the upland site-specific surface reuse criteria for PCBs.

Four beach samples exceed the upland site-specific surface reuse criteria for arsenic, but all are below the subsurface reuse criteria. Two beach samples exceed the upland site-specific subsurface reuse criteria for arsenic: one surface sample at location S-55d was within a factor of two of the arsenic subsurface criteria; the other surface sample (RB8) was an order of magnitude greater than the arsenic subsurface criteria. Three beach samples exceed the upland subsurface reuse criteria for manganese, and all are within a factor of three of the criteria.

All 10 samples collected from beach material beneath the slag/soil fill layer are below both site-specific surface and subsurface upland reuse criteria for total PCBs and metals (Table 2; Figure 4).

As discussed below, the selected beach soil reuse areas will be capped and subject to long-term management controls. Thus beach soil below subsurface criteria, as well as beach soil with slight exceedances of subsurface criteria, will be appropriately managed in the subsurface of the planned soil reuse areas. Additional sampling of beach soil is therefore not needed.

## SOIL REUSE PLAN

The two upland fill areas at the mill identified for permanent reuse of beach and berm soil are the concrete-lined mold basement in the former melt shop and a relatively thin fill placed along the north side of the east landfill. These two areas do not pose an ecological risk, do not provide a direct erosion pathway to the Willamette River, and are relatively low-traffic and low-use areas on the facility. The majority of the soil is below site-specific and DEQ generic human health RBCs, although some soils slightly exceed these criteria. The design and management measures described below make this soil reuse protective of human health exposures.

## Mold Basement

The mold basement is an unused basement in the former EOS melt shop; when the shop was operational, this basement was used to cast steel slabs. As shown in the basement plans included in Attachment A, the basement floor and walls are constructed of a heavily reinforced, 2.5-ft-thick layer of concrete with water stops between the floor and walls. The surface of the mold basement is 34 ft NGVD29 and, at its deepest, the basement floor is 18 ft NGVD29. Because of the thick concrete lining, the mold basement provides secure permanent storage for beach soil with low levels of PCB and metals. A portion of the mold basement extends below the water table; however, communication with the aquifer will be limited as a result of the concrete barrier and due to the fact that the contaminants of concern are not significantly mobile.

The mold basement is estimated to hold between 3,500 and 4,000 cubic yards (cy) of beach material. Excavated beach areas designated for placement in the mold basement are shown on Figure 5. These areas include upper beach and beach soil below the slag/soil fill layer, including areas where soil has exceeded upland subsurface reuse criteria for PCBs and arsenic. The silty slag/soil fill has been observed to be physically quite different from the underlying granular beach material, so the slag/soil fill will first be separated from the underlying beach material using visual observations. An additional six inches of beach soil beneath the slag/soil fill layer will be removed for disposal along with the slag/soil fill. This will provide a clean break between the two layers and prevent significant amounts of the slag/soil fill from being placed in upland areas.

Fill placed in the mold basement will be compacted in lifts. After filling the mold basement to near surface level with compacted beach soil, a geotextile indicator fabric will be placed on top of the fill. A concrete or granular cap will then be placed on top of the fill and geotextile to provide a working surface and isolate the underlying beach backfill, preventing potential contaminant exposure or migration.

## Fill against the East Landfill

The east landfill originally occupied an area of 5.5 acres and contained refractory waste and some mill trash. In 2005, DEQ permitted the modification and expansion of the landfill (solid waste letter authorization [SWLA] permit no. 1326) to include an additional 80,000 cy of soil from construction work. Some of these construction-related soils exceeded screening values for specific contaminants.

Currently, there is a narrow strip of unused land adjacent to the north side of the east landfill and south of a northern access road (Figure 1). EOS plans to reuse between 4,000 to 6,500 cy of excavated beach and berm material (Figure 5) for construction of a long, narrow fill against the northern flank of the landfill (Figure 6). This fill will be 15 ft wide at the base, with a maximum height of 20 ft. The core of the fill will consist of excavated beach material that will be covered with a geotextile indicator fabric.

PCB sample results from upper beach and beach soil below the slag/soil fill layer that are planned for reuse at the landfill meet the site-specific upland surface and subsurface reuse criteria (Table 2; Figure 3). In addition, metals sample results from the beach material meet surface and subsurface upland reuse criteria, with two exceptions. Manganese concentrations in two beach surface soil samples (plus one duplicate) near the southern end of the project area exceed subsurface reuse criteria by less than a factor of three.

Beach material used to construct the fill will be placed and compacted in lifts. A 1-ft-thick layer of berm material meeting surface and subsurface upland reuse criteria for metals and PCBs will be placed over the geotextile indicator fabric and will serve as a cap for the underlying beach material and provide a medium for grass growth. Jute matting will be placed over the entire surface of berm material for erosion control until the surface vegetation is established. The exposed surface of jute matting will be hydroseeded to further stabilize the new fill.

The 1-ft berm material will isolate beach material, preventing exposure and migration of beach soil. Although some beach soils slightly exceed the subsurface reuse criteria for manganese, the east landfill has institutional controls in place, and the new fill against the landfill will be subject to the same controls. The existing landfill cap and surface will not be disturbed during placement of the excavated soils.

No additional storm drainage measures will be necessary at the East Landfill since drainage patterns from the landfill are not being modified. Stormwater will continue to sheet flow to the north of the landfill/fill slope and infiltrate into railroad ballast.

## LONG-TERM MANAGEMENT CONTROLS FOR REUSE AREAS

### Mold Basement

Long-term management controls will be placed on the mold basement as part of the DEQ approved final upland remedial action and be documented in an easement and equitable servitude (EES). Long-term management controls will include appropriate safety and disposal protocols for any excavation into the fill and cap maintenance to prevent contact with any soil exceeding subsurface criteria. The EES ultimately will be filed with the property deed. In the short term, this area will be included in the site-specific soil management plan, controlling excavation and disposal of soil.

## Fill against the East Landfill

Management and monitoring of the fill will follow the conditions set forth in SWLA permit no. 1326, dated September 23, 2005, for reconfiguring and adding soil to the closed landfill. This includes quarterly surface visual inspections after the first year of construction, and annual inspections thereafter.

## REFERENCES

AECOM. 2009. Southern riverbank additional characterization of soils report. Prepared for EVRAZ Oregon Steel Mills Inc. June 22. AECOM.

AECOM. 2011. Revised EOS additional riverbank and upper beach soil sampling report. Prepared for EVRAZ Oregon Steel Mills Inc. August 17. AECOM.

AECOM and Integral. 2014. Upland human health risk assessment for the EVRAZ Oregon Steel Facility, Portland Oregon. April. AECOM and Integral Consulting Inc.

Exponent. 2004a. Phase I remedial investigation report, Oregon Steel Mills Inc., Portland, Oregon. March. Exponent.

Exponent. 2004b. Phase IIA remedial investigation soil and slag soil-fill sampling data report, Oregon Steel Mills Inc., Portland, Oregon. June. Exponent.

Integral. 2015. Data report for berm, upper beach, and north alcove sampling, EVRAZ Oregon Steel. January. Integral Consulting Inc., Portland, OR.

Integral and Crete. 2015. Design report, riverbank source control measure, EVRAZ Oregon Steel. February. Integral Consulting Inc., Portland, OR, and Crete Consulting, Inc., Seattle, WA.

RETEC. 2006. Riverbank source control evaluation report. Prepared for Oregon Steel Mills Inc. May 17. The RETEC Group, Inc.

# FIGURES

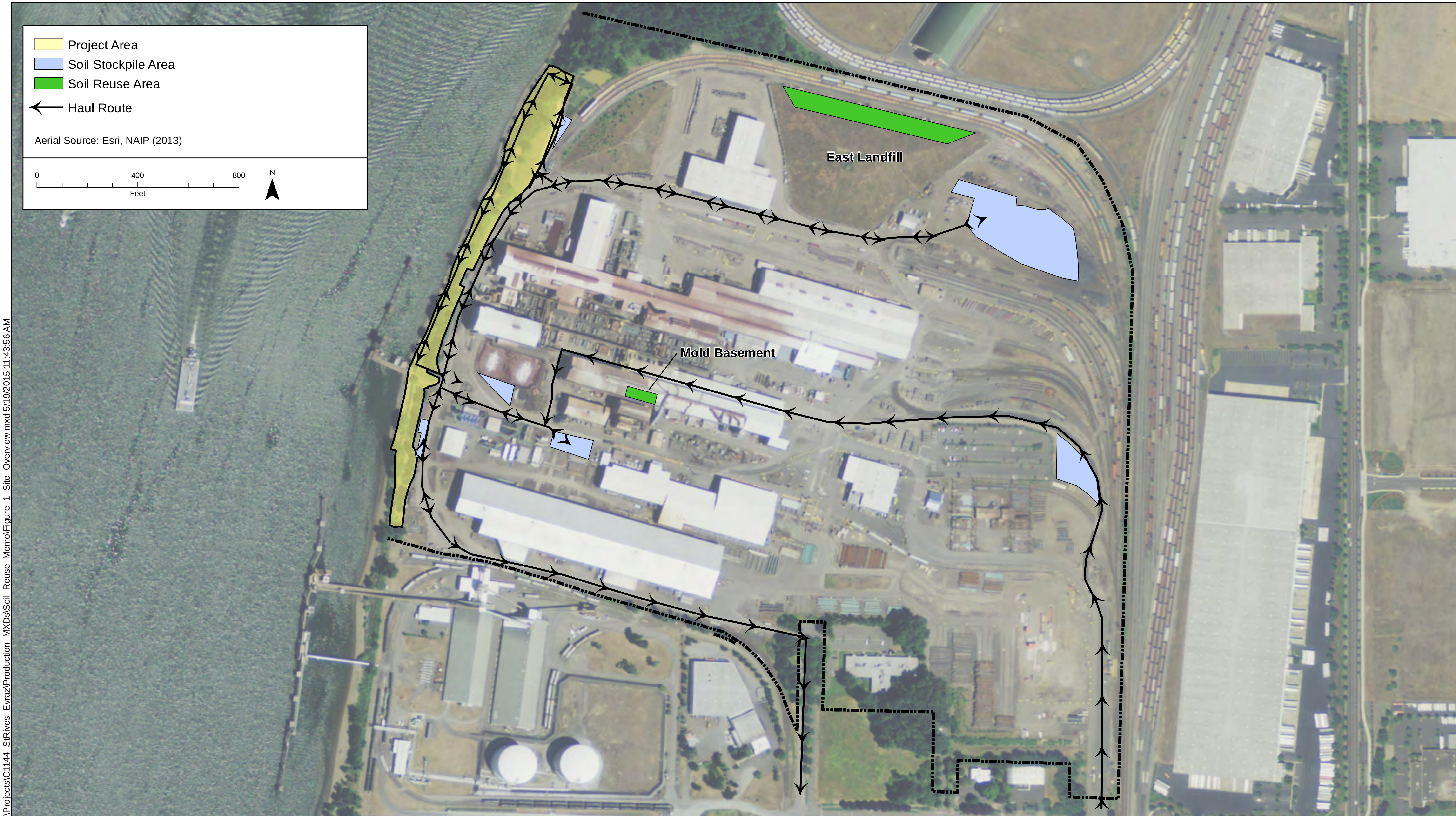


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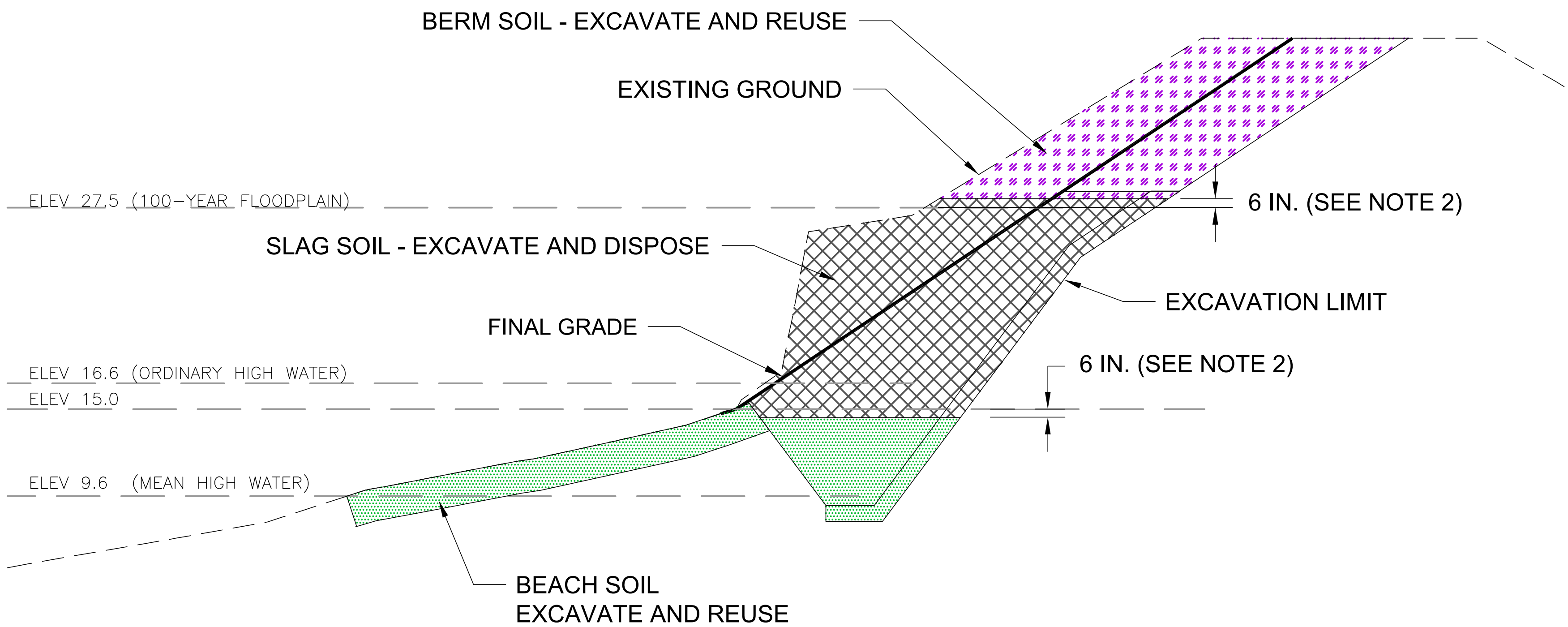
**Figure 1.**
Site Map
Evraz Oregon Steel
Portland, OR




NOTES:

1. BEACH AND SLAG SOIL FILL CONTACT AT ELEV 22.0 IN THE NORTHERN ALCOVE
2. THE CONTACT BETWEEN THE SLAG SOIL FILL WILL BE VERIFIED BY THE ENGINEER DURING EXCAVATION

NOT TO SCALE

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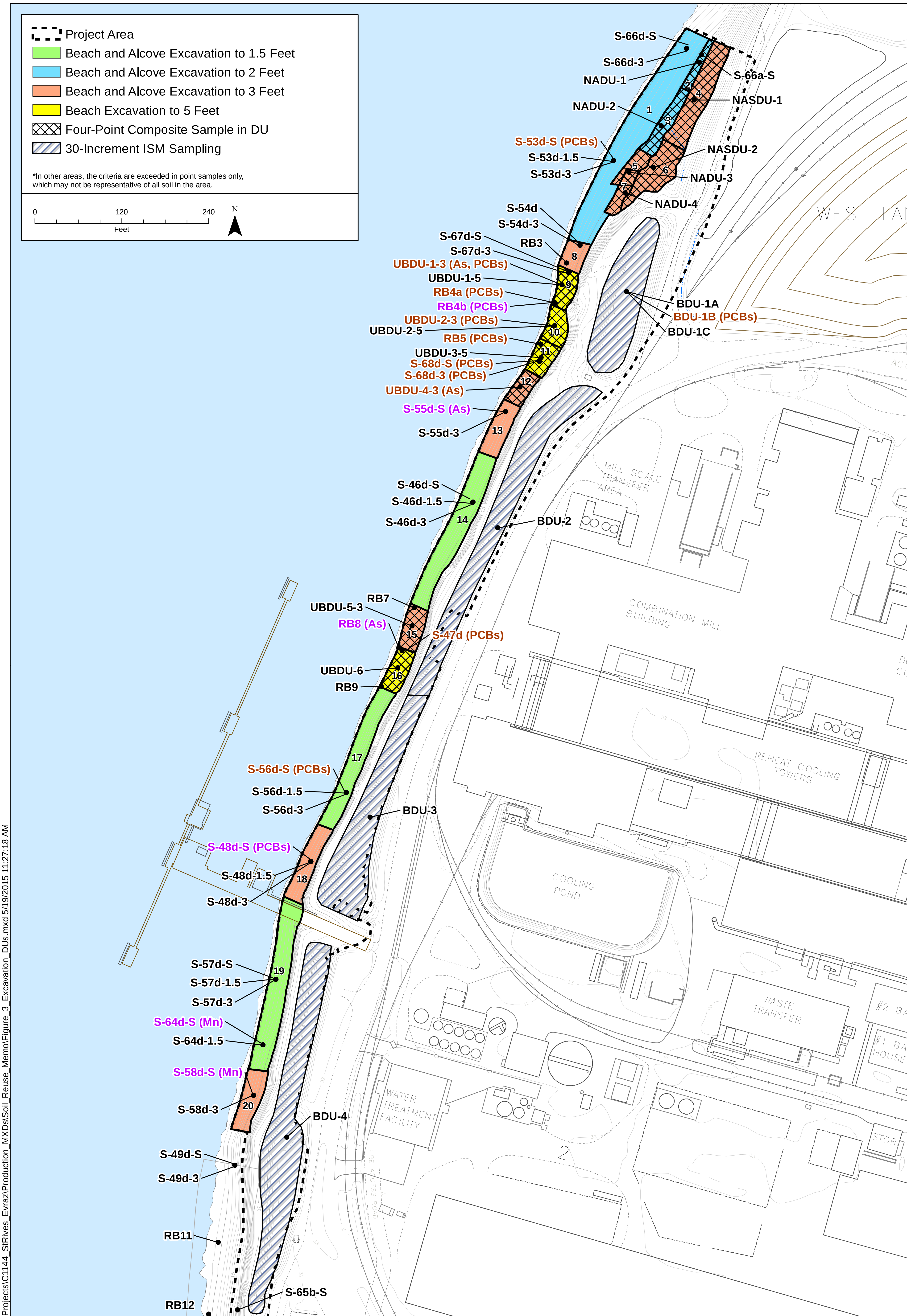
**Figure 2.**
Excavation and Reuse Typical Cross Section
Evraz Oregon Steel
Portland, OR




Location ID — Suitable for Surface Reuse
Location ID (xx) — Suitable for Subsurface Reuse Only
Location ID (xx) — Exceeds Subsurface Reuse Criteria
Chemical Exceeding Criteria

Note: All soil in the toe, under the bank, is suitable for surface reuse.

**Figure 3.**
Berm, Beach, and Alcove Decision/Excavation Units
Evraz Oregon Steel
Portland, OR

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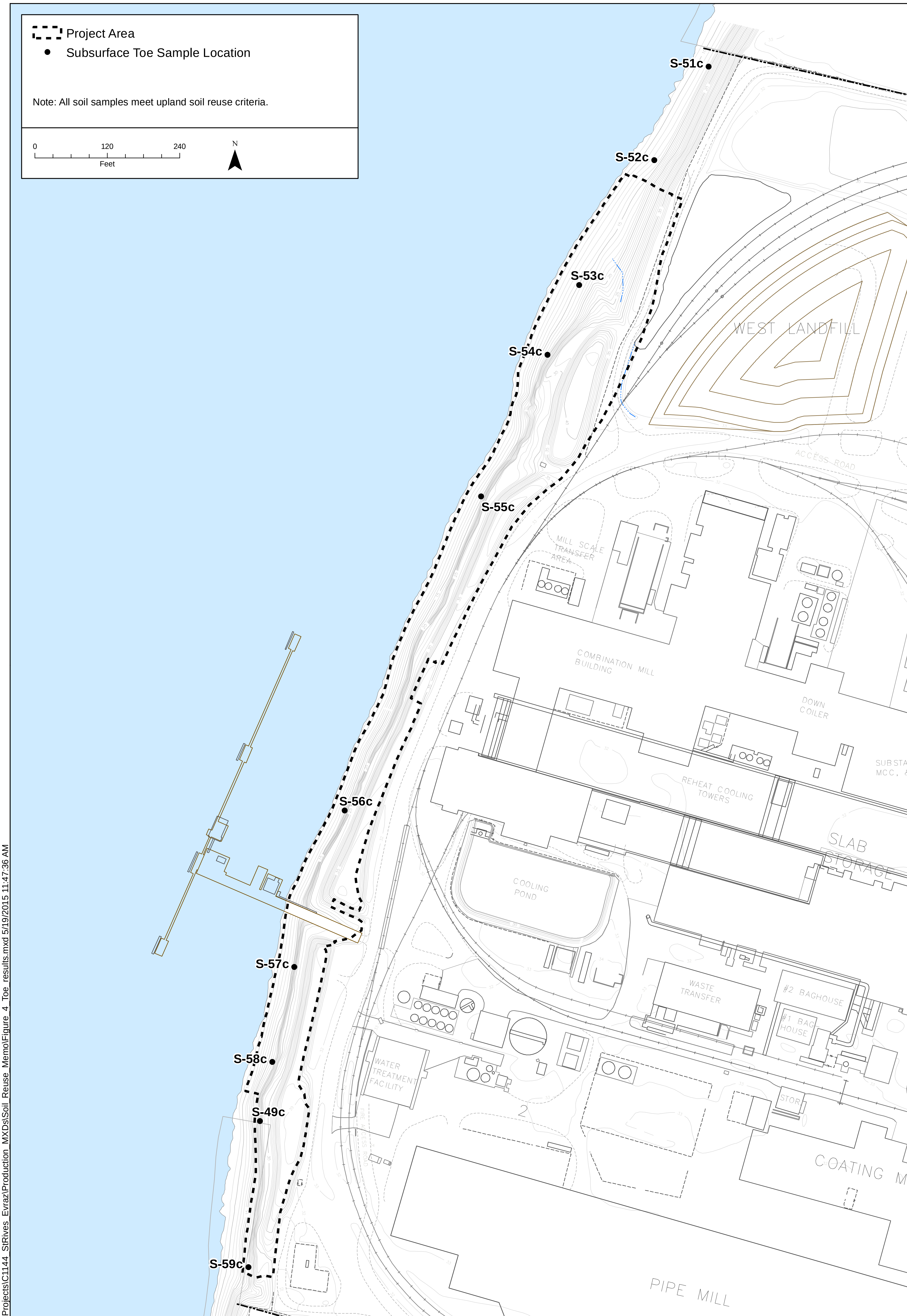


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**Figure 4.**
Beach Samples Collected Beneath the Slag/Soil Fill Layer
Evraz Oregon Steel
Portland, OR

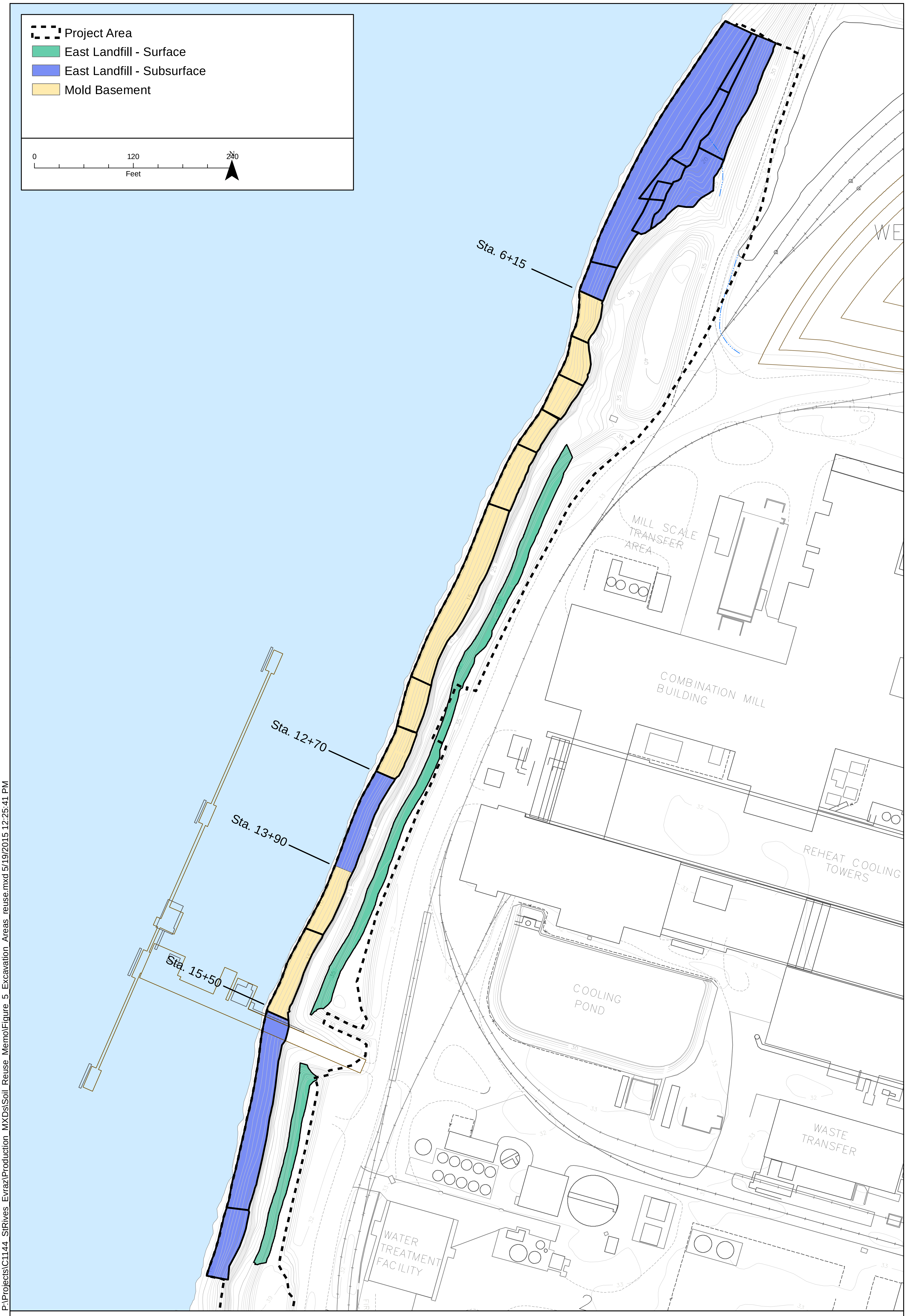


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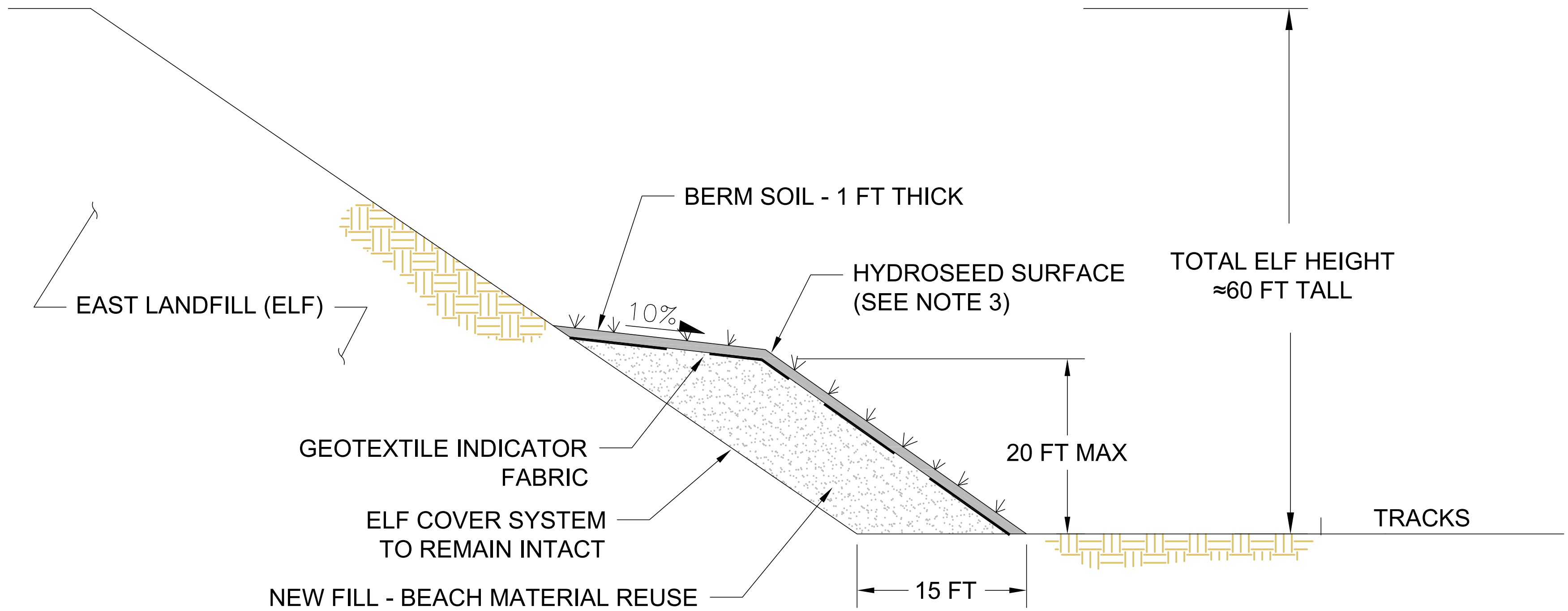
**Figure 5.**
Soil Reuse Designation
Evraz Oregon Steel
Portland, OR




NOTES:

1. REMOVE AND STORE ANY SURFACE SPRINKLER SYSTEM COMPONENTS PRESENT IN THE WORK AREA. THE ELF LINER SYSTEM TO REMAIN INTACT. PLACE FIRST LIFT DIRECTLY ON SURFACE OF ELF.

2. PLACE SALVAGED MATERIAL IN ONE OPERATION IN A MANNER TO AVOID DISPLACING THE UNDERLYING MATERIAL OR PLACING UNDUE IMPACT FORCE ON UNDERLYING MATERIALS AND SUPPORTING SUBSOIL. PLACEMENT OF SALVAGED MATERIAL SHALL BEGIN AT THE BOTTOM OF THE SLOPE AND PROCEED UPWARD.

3. HYDROSEED SURFACE WITH JUTE MAT FOR TEMPORARY PROTECTION UNTIL VEGETATION IS ESTABLISHED.

NOT TO SCALE

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**Figure 6.**
East Landfill Typical Cross Section
Evraz Oregon Steel
Portland, OR

# TABLES

Table 1. Soil Reuse Criteria

| Analyte | Site-Specific Upland Surface Soil | Site-Specific Upland Subsurface Soil | DEQ Generic RBC Upland Surface Soil | DEQ Generic RBC Upland Subsurface Soil |
|---|---|---|---|---|
| **Metals (mg/kg)** | | | | |
| Arsenic | 8.8 | 13 | <background | 13 |
| Cadmium | 150 | 150 | 150 | 150 |
| Chromium | 460,000 | 460,000 | 460,000 | 460,000 |
| Copper | 12,000 | 12,000 | 12,000 | 12,000 |
| Lead | 800 | 800 | 800 | 800 |
| Manganese | 14,609 | 14,609 | 7,200 | 7,200 |
| **PCBs (mg/kg)** | | | | |
| Total PCBs | 0.85 | 8.8 | 0.56 | 4.4 |

Notes:

DEQ = [Oregon] Department of Environmental Quality
PCB = polychlorinated biphenyl
RBC = risk-based concentration

Soil reuse criteria sources:

Arsenic surface soil is DEQ background.

Total PCBs and manganese from EVRAZ's site-specific human health risk assessment (AECOM and Integral 2014). Total PCBs for surface soil is occupational worker RBC; subsurface soil and manganese in surface soil is construction worker RBC.

Other constituents and DEQ generic RBCs are from the *Risk-Based Concentrations for Individual Chemicals.* Revision: June 7, 2012 (http://www.deq.state.or.us/lq/pubs/docs/RBDMTable.pdf).

Table 2 - Berm, Beach, North Alcove, and Toe Analytical Results

| Northern Property Boundary (ft) | Sample Identification | Sample Collection Date | Sample Depth (ft) | Fill Unit | PCBs (in mg/kg) | Metals (in mg/kg) | | | | | | | Reuse Criteria Exceedance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Total PCBs | Arsenic | Cadmium | Chromium | Copper | Lead | Manganese | Zinc | |
| | | | | Subsurface Soil Reuse Criteria | 9 | 13 | 150 | 460,000 | 12,000 | 800 | 14,609 | NA | |
| | | | | Surface Soil Reuse Criteria | 0.85 | 8.8 | 150 | 460,000 | 12,000 | 800 | 14,609 | NA | |
| | | | | | Total PCBs (mg/kg) | | | | | | | | |
| 75 | RB1 | 10/10/2000 | 0.33 | Beach | 0.14 | 2.2 | <1 | 21.7 | 12.8 | <20.4 | NA | 68.9 | None |
| 160 | RB2 | 10/10/2000 | 0.33 | Beach | 0.18 | 2.2 | <1 | 26.1 | 13.4 | <20.5 | NA | 74.3 | None |
| 265 | S-66d-3-1109 | 11/1/2009 | 3 | Beach | <0.099 | 2.6 | 0.11 | 32.9 | 28.3 | 6.39 | 660 | 60.5 | None |
| 265 | S-66d-Surface-1109 | 11/1/2009 | 0 | Beach | <0.099 | 3 | 0.1 | 30.7 | 27.8 | 4.71 | 578 | 66.3 | None |
| 440 | S-53d-1.5-1109 | 11/19/2009 | 1.5 | Beach | 0.06 | NA | NA | NA | NA | NA | 3,540 | NA | None |
| 440 | S-53d-3-1109 | 11/19/2009 | 3 | Beach | <0.10 | 1.1 | 0.12 | 5 | 6 | 3.25 | 137 | 38 | None |
| 440 | S-53d-Surface-1109 | 11/19/2009 | 0 | Beach | 1.43 | 2.3 | 0.81 | 69.6 | 29 | 60.5 | 1,650 | 268 | Surface |
| 555 | S-54d-3-1109 | 11/19/2009 | 3 | Beach | 0.10 | 2.2 | 0.22 | 12 | 12.8 | 9.61 | 805 | 84 | None |
| 555 | S-54d-Surface-1109 | 11/19/2009 | 0 | Beach | 0.21 | 1.4 | 0.14 | 10.4 | 8 | 4.73 | 201 | 46.4 | None |
| 595 | S-67d-3-1109 | 11/19/2009 | 3 | Beach | 0.13 | 1.6 | 0.24 | 18.8 | 16.4 | 13.9 | 230 | 99.5 | None |
| 595 | S-67d-Surface-1109 | 11/19/2009 | 0 | Beach | 0.47 | 3 | 0.54 | 99.5 | 36.8 | 41.1 | 2,540 | 189 | None |
| 615 | RB3 | 10/10/2000 | 0.33 | Beach | 0.81 | 4.6 | <1 | 640 | 102 | <20.8 | NA | 116 | None |
| 720 | S-68d-3-1109 | 11/19/2009 | 3 | Beach | 4.30 | 4.4 | 2.28 | 1530 | 34.6 | 197 | 14,000 | 805 | Surface |
| 720 | S-68d-Surface-1109 | 11/19/2009 | 0 | Beach | 4.60 | 4.4 | 2.43 | 194 | 51.7 | 237 | 6,460 | 509 | Surface |
| 800 | S-55d-3-1109 | 11/18/2009 | 3 | Beach | 0.12 | 2.1 | 0.32 | 37.2 | 12 | 12 | 3,680 | 96 | None |
| 800 | S-55d-Surface-1109 | 11/18/2009 | 0 | Beach | 0.17 | 20.1 | 0.47 | 16.4 | 31.3 | 29 | 5,140 | 122 | Subsurface |
| 975 | S-46d-1.5-1109 | 11/1/2009 | 1.5 | Beach | 0.05 | NA | NA | NA | NA | NA | 843 | 30.3 | None |
| 975 | S-46d-3-1109 | 11/1/2009 | 3 | Beach | <0.098 | 1 | 0.1 | 5.2 | 5.2 | 2.4 | 147 | 32 | None |
| 975 | S-46d-Surface-1109 | 11/1/2009 | 0 | Beach | 0.57 | 3.3 | 0.21 | 93.1 | 20.4 | 7.95 | 2,690 | 56.9 | None |
| 1140 | RB7 | 10/10/2000 | 0.33 | Beach | <0.20 | 1.8 | <1.1 | 13.1 | 11.1 | <21 | NA | 43.1 | None |
| 1145 | S-47d | 11/18/2009 | | Beach | 0.44 | NA | NA | NA | NA | NA | NA | NA | None |
| 1145 | S-47d-3-1109 | 11/18/2009 | 3 | Beach | 0.88 | 2.6 | 0.52 | 75.7 | 144 | 25 | 1220 | 744 | Surface |
| 1190 | RB8 | 10/10/2000 | 0.33 | Beach | 0.19 | 132 | 2.1 | 223 | 103 | 103 | NA | 823 | Subsurface |
| 1250 | RB9 | 10/10/2000 | 0.33 | Beach | 0.55 | 6.6 | <1.1 | 252 | 145 | 166 | NA | 209 | None |
| 1350 | S-56d-1.5-1109 | 11/18/2009 | 1.5 | Beach | 0.01 | NA | NA | NA | NA | 4.86 | NA | 61.2 | None |
| 1350 | S-56d-3-1109 | 11/18/2009 | 3 | Beach | 0.06 | 1.4 | 0.24 | 7.5 | 10 | 15.7 | 241 | 75.7 | None |
| 1350 | S-56d-Surface-1109 | 11/18/2009 | 0 | Beach | 3.30 | NA | NA | NA | NA | 185 | NA | 773 | Surface |
| 1450 | S-48d-1.5-1109 | 11/18/2009 | 1.5 | Beach | 0.03 | NA | NA | NA | NA | NA | NA | NA | None |
| 1450 | S-48d-3-1109 | 11/18/2009 | 3 | Beach | 0.22 | 1.1 | 0.18 | 7.7 | 5.1 | 4.43 | 196 | 53.4 | None |
| 1450 | S-48d-S | 11/18/2009 | | Beach | 9.30 | | | | | | | | Subsurface |
| 1615 | S-57d-1.5-1109 | 11/20/2009 | 1.5 | Beach | 0.02 | NA | NA | NA | NA | NA | 268 | NA | None |
| 1615 | S-57d-3-1109 | 11/20/2009 | 3 | Beach | <0.087 | 1.8 | 0.14 | 7.8 | 16.6 | 4.52 | 370 | 45.7 | None |
| 1615 | S-57d-S (dup)A-1109 | 11/20/2009 | 0 | Beach | 0.78 | 2.2 | 0.36 | 86.4 | 22.1 | 22.2 | 1,760 | 128 | None |
| 1615 | S-57d-Surface-1109 | 11/20/2009 | 0 | Beach | 0.26 | 2 | 0.33 | 28.2 | 27.4 | 20.3 | 629 | 125 | None |
| 1705 | S-64d-1.5-1109 | 11/20/2009 | 1.5 | Beach | <0.098 | 2.5 | 0.14 | 7.7 | 9.84 | 5.59 | 718 | 47.8 | None |
| 1705 | S-64d-S (dup)A-5-1109 | 11/20/2009 | 0 | Beach | 0.029 | 9.1 | 0.53 | 46.5 | 20.9 | 12.5 | 19,600 | 76.3 | Subsurface |
| 1705 | S-64d-Surface-1109 | 11/20/2009 | 0 | Beach | <0.099 | 7.7 | 0.43 | 58.4 | 26.9 | 9.55 | 21,700 | 67.3 | Subsurface |
| 1770 | S-58d-3-1109 | 11/20/2009 | 3 | Beach | 0.193 | 2.2 | 0.14 | 24.1 | 14.6 | 9.09 | 999 | 65.4 | None |
| 1770 | S-58d-Surface-1109 | 11/20/2009 | | Beach | 0.43 | NA | NA | 321 | NA | NA | 34,000 | NA | Subsurface |
| 1,130 - 1,195 | S-UBDU-5-3 | 10/22/14 | 3 | Beach | <0.027 | 2.57 | 0.21 | 209 | 31.3 | 18.7 | 2,890 | 88.3 | None |
| 1,195 - 1255 | S-UBDU-6-5 | 10/22/14 | 5 | Beach | 0.006 | 3.73 | 0.172 | 18.7 | 18 | 7.69 | 396 | 67.8 | None |
| 1,195 - 1255 | S-UBDU-6-5 DUP | 10/22/14 | 5 | Beach | 0.012 | 3.81 | 0.204 | 23.3 | 19.2 | 8.64 | 519 | 69.7 | None |
| 625 - 680 | S-UBDU-1-3 | 10/21/14 | 3 | Beach | 0.87 | 10.6 | 1 | 148 | 56 | 48 | 1,830 | 184 | Surface |
| 625 - 680 | S-UBDU-1-5 | 10/21/14 | 5 | Beach | <0.028 | 2.68 | 0.093 | 31.2 | 28 | 6.63 | 289 | 57.2 | None |
| 680 - 730 | S-UBDU-2-3 | 10/21/14 | 3 | Beach | 0.97 | 4.73 | 0.39 | 49.7 | 27.8 | 24.4 | 1130 | 127 | Surface |
| 680 - 730 | S-UBDU-2-3 DUP | 10/21/14 | 3 | Beach | 0.561 | 5.14 | 0.425 | 74.8 | 31.1 | 25.5 | 1260 | 149 | None |
| 680 - 730 | S-UBDU-2-5 | 10/21/14 | 5 | Beach | <0.021 | 5.43 | 0.238 | 31.3 | 34.9 | 20 | 460 | 86.3 | None |
| 730 - 775 | S-UBDU-3-5 | 10/21/14 | 5 | Beach | 0.175 | 5.21 | 0.21 | 33.5 | 33.6 | 14 | 451 | 84.7 | None |
| 775 - 825 | S-UBDU-4-3 | 10/21/14 | 3 | Beach | <0.028 | 10.8 | 0.48 | 24.3 | 37 | 31.6 | 650 | 139 | Surface |
| 680 | RB4a | 10/10/2000 | 0.33 | Beach | 1.8 | 2.0 | 1.5 | 229 | 38.5 | 109 | NA | 698 | Surface |
| 680 | RB4b | 10/10/2000 | 1 | Beach | 9.3 | 2.8 | <1.1 | 277 | 54.4 | 108 | NA | 479 | Subsurface |
| 725 | RB5 | 10/10/2000 | 0.33 | Beach | 2.8 | 6.8 | <1 | 252 | 36.0 | 67.5 | NA | 345 | Surface |
| 65 | S-51a | 9/1/2005 | 1-1.5 | Berm | <0.020 | NA | NA | NA | NA | NA | NA | NA | None |
| 265 | S-66a | 11/19/2009 | 1-1.5 | Berm | <0.098 | NA | NA | NA | NA | NA | NA | NA | None |
| 650 | S-45a | Oct. 2003 | 1 | Berm | 0.126 | NA | NA | NA | NA | NA | NA | NA | None |
| 800 | S-55a | 8/30/2005 | 1-1.5 | Berm | 0.011 | 6.39 | <0.238 | 127 | 24.6 | 8.95 | 1,200 | 73.4 | None |
| 975 | S-46a | Oct. 2003 | 1-1.5 | Berm | <0.021 | NA | NA | NA | NA | NA | NA | NA | None |
| 1145 | S-47a | Oct. 2003 | 1-1.5 | Berm | 1.3 | NA | NA | NA | NA | NA | NA | NA | Surface |
| 1450 | S-48a | Oct. 2003 | 1-1.5 | Berm | <0.021 | NA | NA | NA | NA | NA | NA | NA | None |
| 1615 | S-57a | 9/1/2005 | 1-1.5 | Berm | 0.12 | 9.49 | 1.06 | 335 | 130 | 10.3 | 3,090 | 76.3 | Surface |
| 1865 | S-49a | Oct. 2003 | 1-1.5 | Berm | <0.020 | NA | NA | NA | NA | NA | NA | NA | None |
| 2100 | S-69a | 11/20/2009 | 1-1.5 | Berm | 0.095 | NA | NA | NA | NA | NA | NA | NA | None |
| 2185 | S-59a | 9/1/2005 | 1-1.5 | Berm | 0.099 | 4.48 | 0.48 | 30.3 | 22.5 | 33.7 | 478 | 192 | None |
| 1,250 - 1,560 | S-BDU-3 | 10/24/2014 | 0-3 | Berm | 0.12 | 4.52 | 0.399 | 95.9 | 29.3 | 13.2 | 1,060 | 87.7 | None |
| 1,600 - 2,120 | S-BDU-4 | 10/24/2014 | 0-3 | Berm | 0.074 | 4.45 | 0.254 | 89.7 | 21.8 | 8.98 | 845 | 76.1 | None |
| 520 - 730 | S-BDU-1A | 10/21/14 | 0-3 | Berm | 0.84 | 5.12 | 0.756 | 311 | 39.8 | 30.3 | 2,910 | 151 | None |
| 520 - 730 | S-BDU-1B | 10/21/14 | 0-3 | Berm | 1.02 | 4.76 | 0.659 | 171 | 32.8 | 26.5 | 1,880 | 137 | Surface |
| 520 - 730 | S-BDU-1C | 10/21/14 | 0-3 | Berm | 0.67 | 4.79 | 0.593 | 155 | 36.7 | 26.6 | 1,600 | 151 | None |
| 760 - 1,250 | S-BDU-2 | 10/21/14 | 0-3 | Berm | 0.21 | 4.54 | 0.346 | 171 | 36.3 | 13.6 | 1,790 | 94.6 | None |
| 250 - 330 | S-NADU-1-1.5 | 10/20/14 | 1.5 | Northern alcove | <0.021 | 4.22 | 0.126 | 30 | 29.3 | 7.25 | 515 | 58.2 | None |
| 250 - 330 | S-NADU-1-3 | 10/20/14 | 3 | Northern alcove | <0.032 | 4.98 | 0.085 | 31.7 | 35.2 | 5.7 | 678 | 59.5 | None |
| 250 - 400 | S-NASDU-1 | 10/22/14 | 1.5 | Northern alcove | 0.49 | 5.27 | 0.412 | 59.6 | 31.9 | 17.9 | 989 | 108 | None |
| 330 - 430 | S-NADU-2-1.5 | 10/20/14 | 1.5 | Northern alcove | 0.043 | 3.13 | 0.167 | 17.5 | 16.5 | 5.94 | 732 | 53.5 | None |
| 330 - 430 | S-NADU-2-3 | 10/20/14 | 3 | Northern alcove | <0.028 | 4.43 | 0.1 | 29.2 | 23.5 | 7.35 | 569 | 56.7 | None |
| 430 - 490 | S-NADU-3-1.5 | 10/20/14 | 1.5 | Northern alcove | 0.034 | 1.95 | 0.16 | 11.6 | 9.92 | 5.21 | 221 | 50.9 | None |
| 430 - 490 | S-NADU-3-3 | 10/20/14 | 3 | Northern alcove | 0.61 | 4.17 | 1.64 | 62.9 | 31.1 | 136 | 1,340 | 400 | None |
| 460 - 530 | S-NADU-4-1.5 | 10/22/14 | 1.5 | Northern alcove | 0.12 | 2.37 | 0.515 | 78.5 | 17 | 47.8 | 912 | 177 | None |
| 460 - 530 | S-NADU-4-3 | 10/22/14 | 3 | Northern alcove | 0.050 | 2.83 | 0.263 | 22.8 | 14 | 12 | 381 | 79.7 | None |
| 625 - 680 | S-NASDU-2 | 10/22/14 | 1.5 | Northern alcove | 0.77 | 4.67 | 0.49 | 159 | 35.9 | 26.8 | 1,750 | 15 | None |
| 680 - 730 | S-NASDU-3 | 10/22/2014 | 3 | Northern alcove | 0.46 | 5.37 | 0.43 | 55 | 31.6 | 18.8 | 917 | 104 | None |
| 65 | S-51c | 8/29/2005 | 3.5 | Toe | <0.020 | 8.07 | <0.253 | 40.3 | 30.7 | 6.2 | 2,370 | 59.3 | None |
| 220 | S-52c | 8/30/2005 | 3 | Toe | <0.020 | 6.76 | <0.135 | 35.4 | 27.4 | 5.34 | 1,150 | 56.2 | None |
| 440 | S-53c | 8/29/2005 | 1 | Toe | 0.080 | 2.95 | 0.281 | <11.6 | 7.95 | 18.9 | 218 | 107 | None |
| 555 | S-54c | 8/30/2005 | 3 | Toe | 0.16 | 2.71 | <0.112 | <9.5 | 8.48 | 5.14 | 202 | 51 | None |
| 800 | S-55c | 8/30/2005 | 2.5 | Toe | 0.072 | 1.87 | <0.216 | <13.9 | 7.91 | 12.8 | 293 | 79 | None |
| 1350 | S-56c | 8/30/2005 | 2.5 | Toe | <0.020 | 2.28 | <0.149 | <9.1 | 7.39 | 3.9 | 148 | 46.8 | None |
| 1615 | S-57c | 9/1/2005 | 2 | Toe | 0.042 | 5.54 | <0.135 | <9.5 | 18.6 | 5.6 | 334 | 52.1 | None |
| 1770 | S-58c | 9/1/2005 | 4 | Toe | 0.35 | 5.51 | 1.26 | 515 | 39.2 | 62 | 14,500 | 306 | None |
| 1865 | S-49c | Oct. 2003 | 1-1.5 | Toe | <0.020 | NA | NA | NA | NA | NA | NA | NA | None |
| 2185 | S-59c | 9/1/2005 | 1 | Toe | <0.020 | 5.49 | <.093 | 14.3 | 16.7 | 3.05 | 267 | 50.9 | None |

Notes:

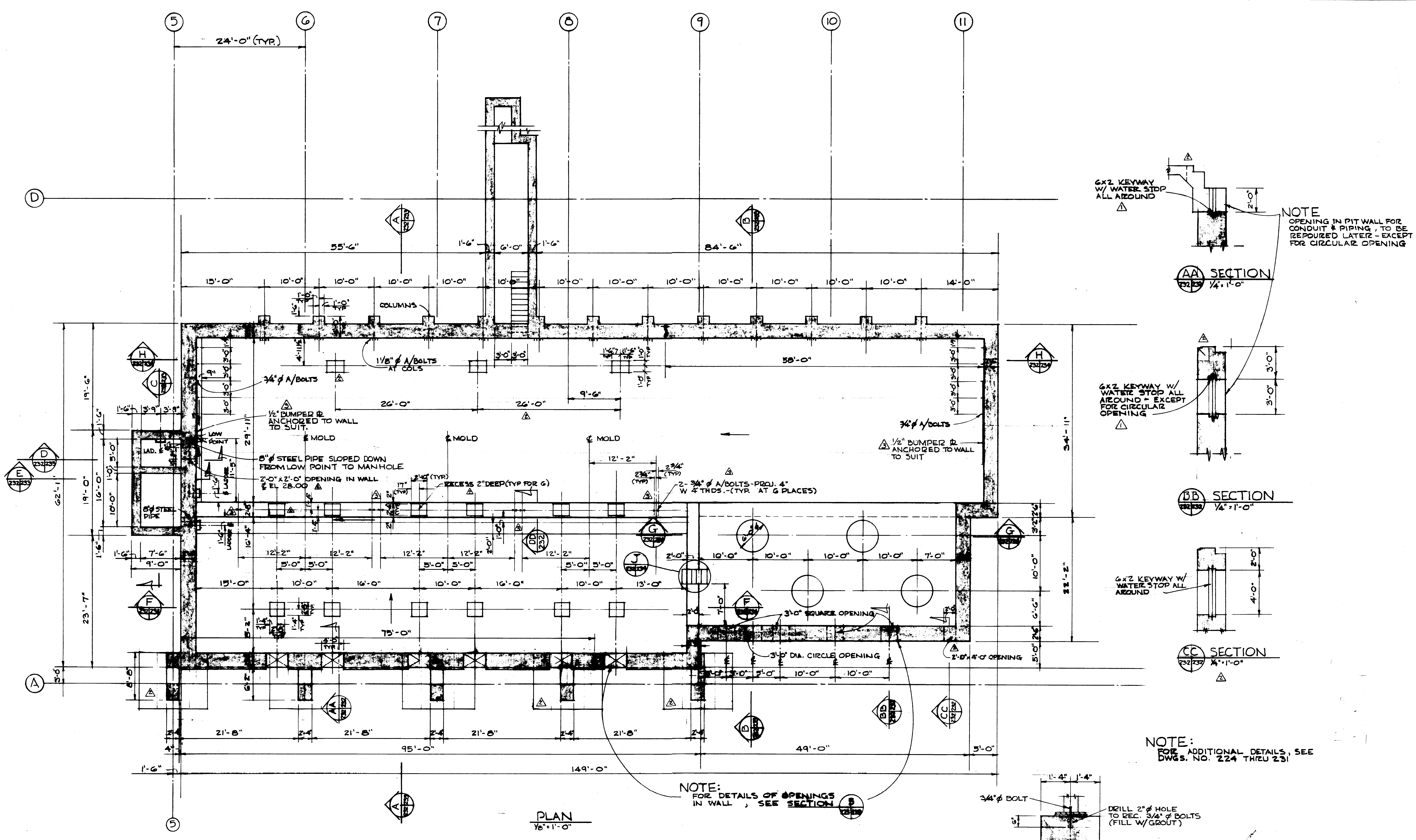
= exceeds subsurface reuse criteria

= exceeds surface reuse criteria

NA = not applicable

# ATTACHMENT A

## MOLD BASEMENT DETAILS






| REVISIONS | |
|---|---|
| 3 ADD 3/4" ϕ A/BOLTS IN CENTER WALL, ADD SECT "DD", ADD 1/2" BUMPER ℄ @ WALLS. | |
| 2 GEN. REV | 5/25/68 |
| 1 ADD KEYWAY TO WALL OPENINGS | |

CONCRETE LAYOUT
MOLD PIT
MELT SHOP

**OREGON STEEL MILLS**
**RIVERGATE DEVELOPMENT**
PORTLAND OREGON

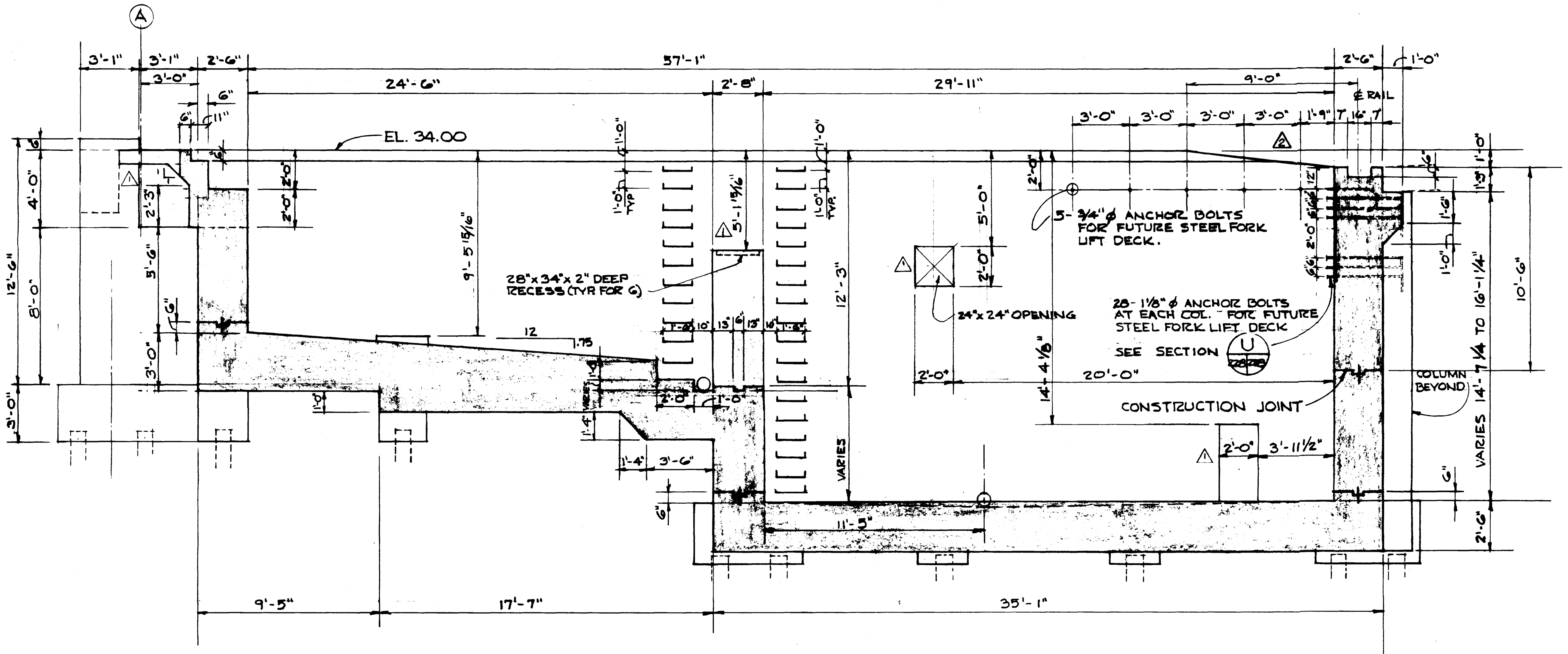
DRAWN BY: P. EYLER
CHECKED BY:
DATE:
JOB: P 227

DRAWING
**232**
3

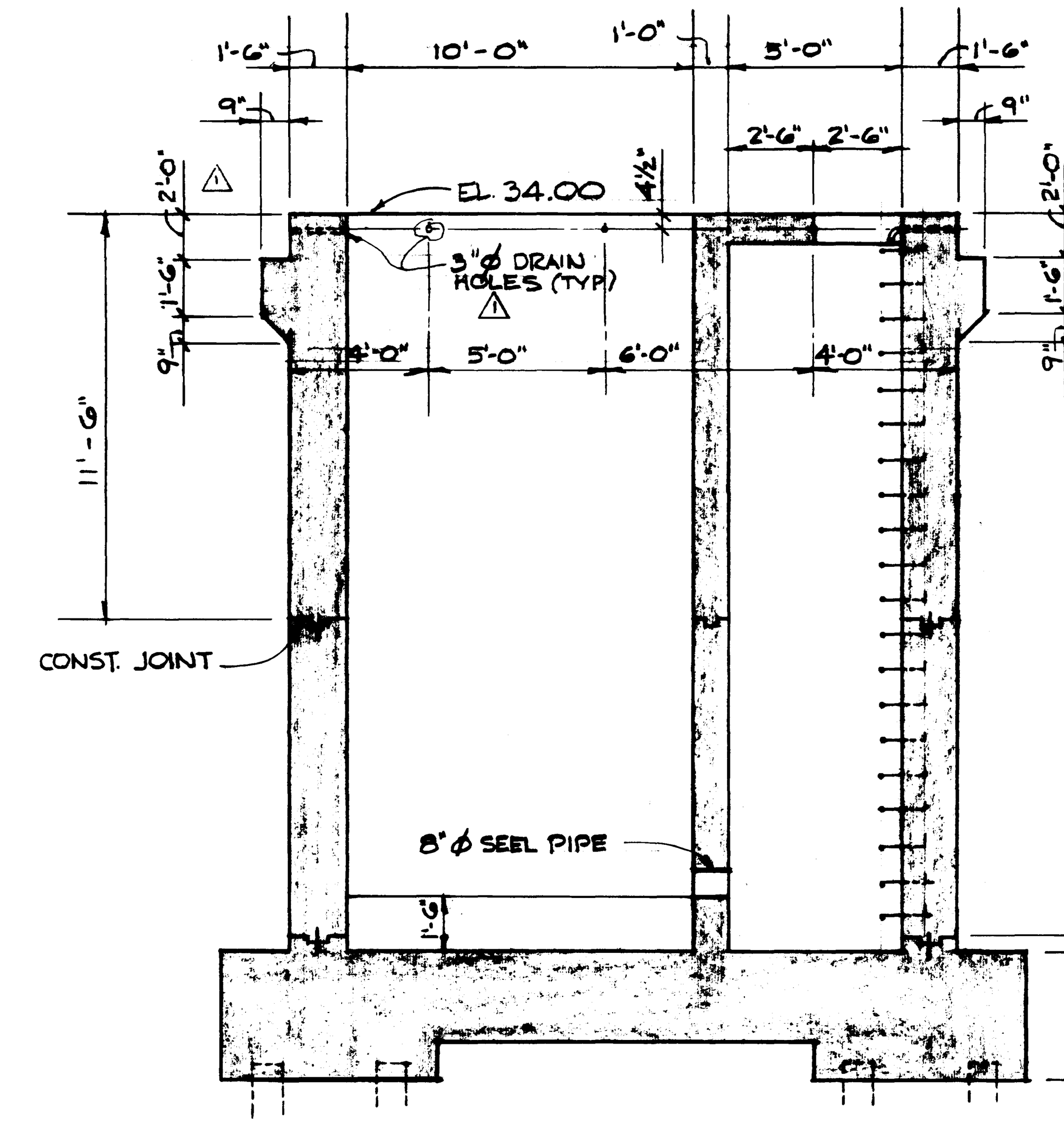
**WERNER S. STORCH & ASSOCIATES, INC.**
CONSULTING ENGINEERS
PORTLAND, OREGON SALEM, OREGON

CODE 470-111
D 2212

3 TO ISSUE

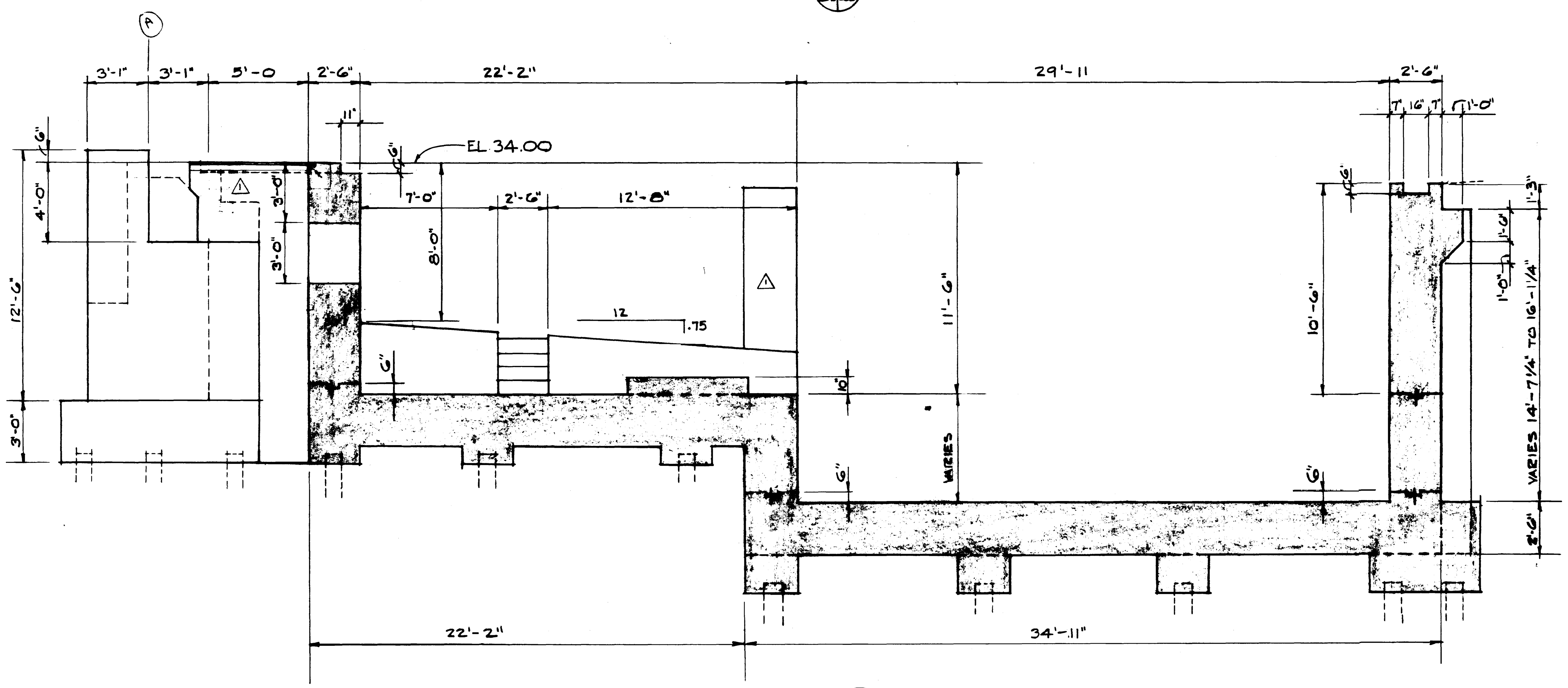



A SECTION 232 233

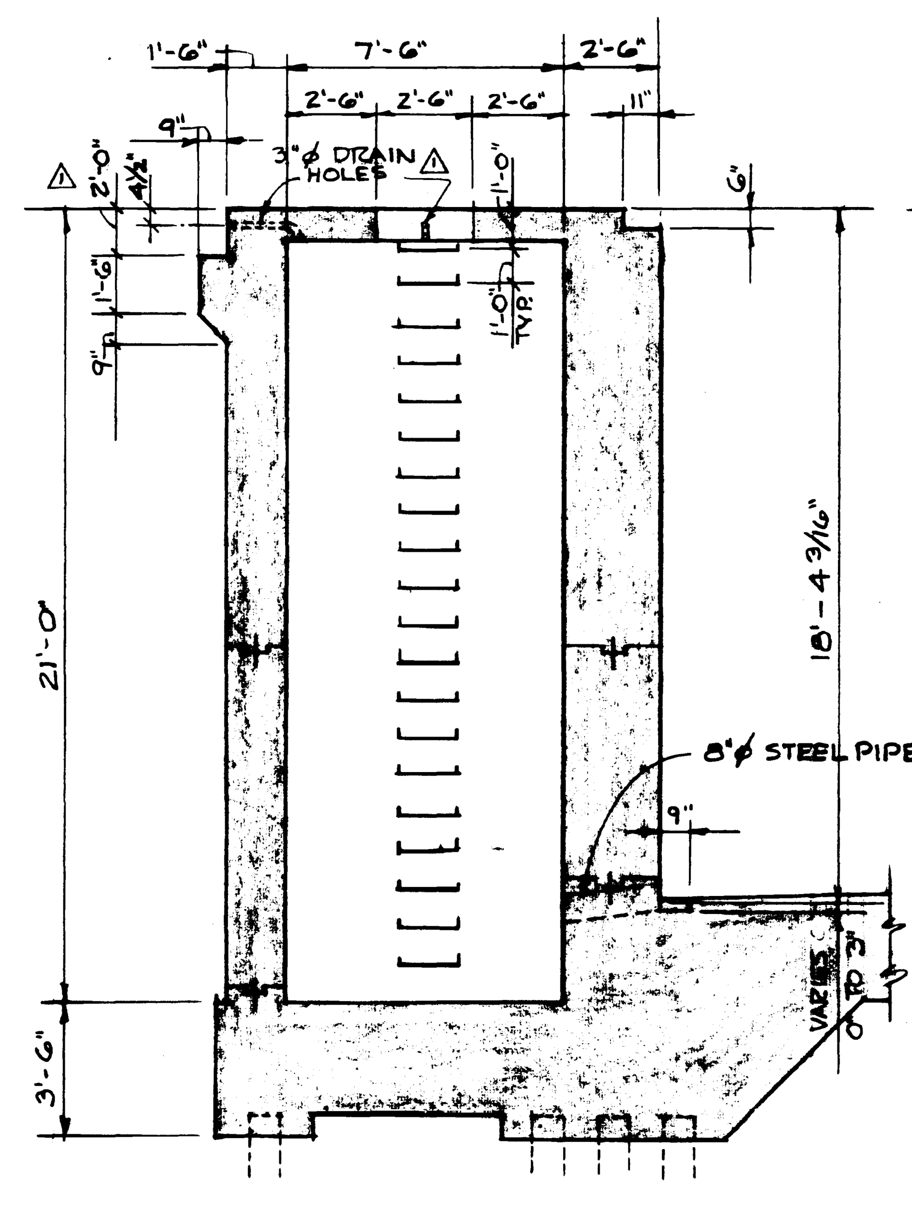



C SECTION 232 233

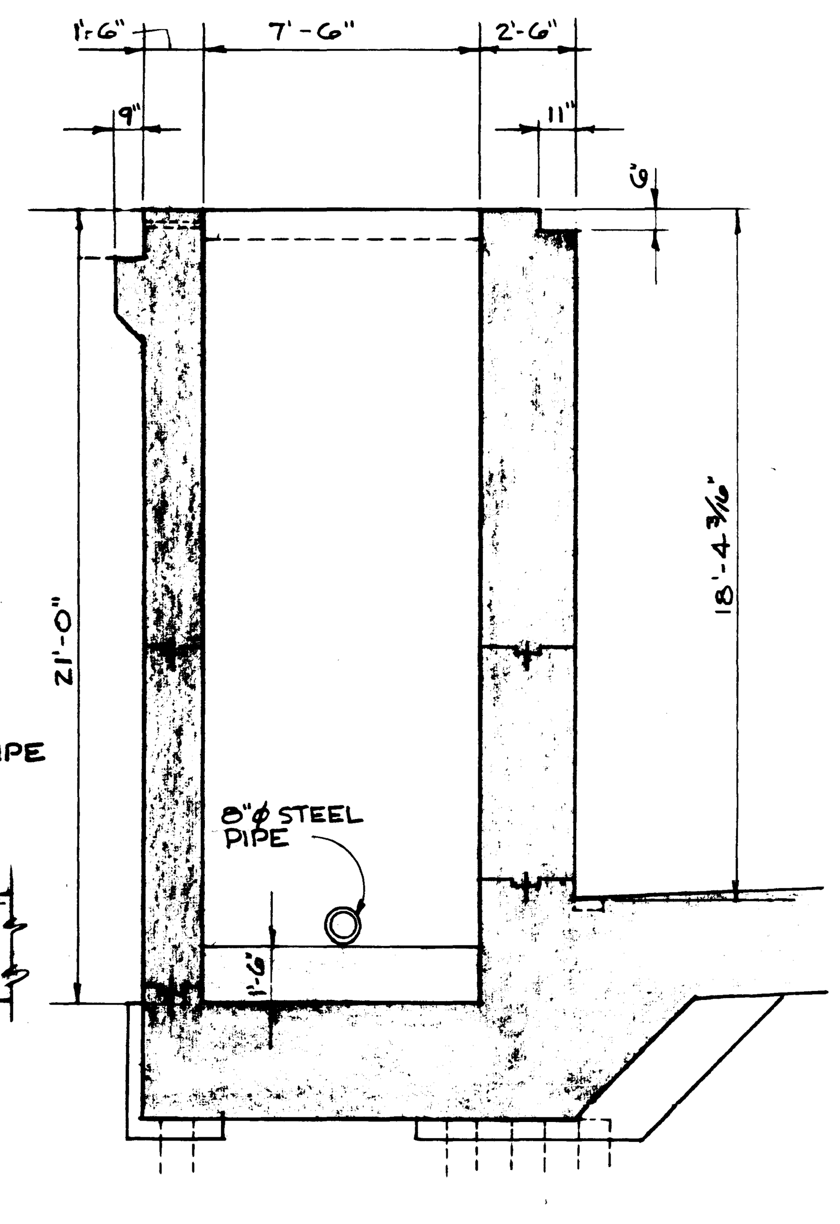
NOTE
SEE DWG 226 & 228
FOR EDGE DETAIL




B SECTION 232 233




D 232 233




E 232 233

NOTE:
FOR PILE CAP DETAILS, SEE DWGS. NO. 229 & 231



| REVISIONS |
|---|
| 2 ADD SLOPE IN TOP OF WALL, SECT A PER O.S.M. INSTRUCT 9/9/68 |
| 1 GEN. REV 5/25/68 |

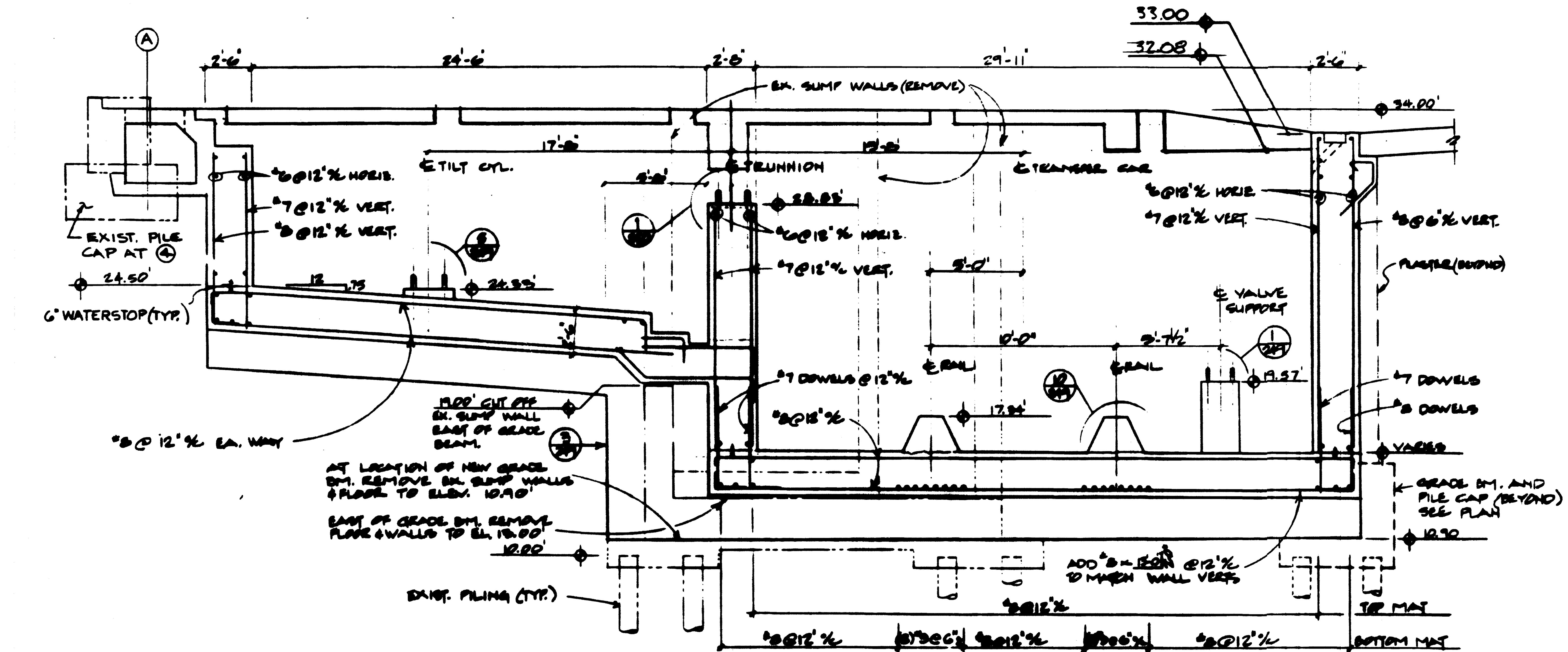
CONCRETE SECTIONS
MOLD PIT
MELT SHOP
SHEET # 1

**OREGON STEEL MILLS**
**RIVERGATE DEVELOPMENT**
PORTLAND OREGON

DRAWN BY: P. EYLER
CHECKED BY:
DATE:
JOB: P 227

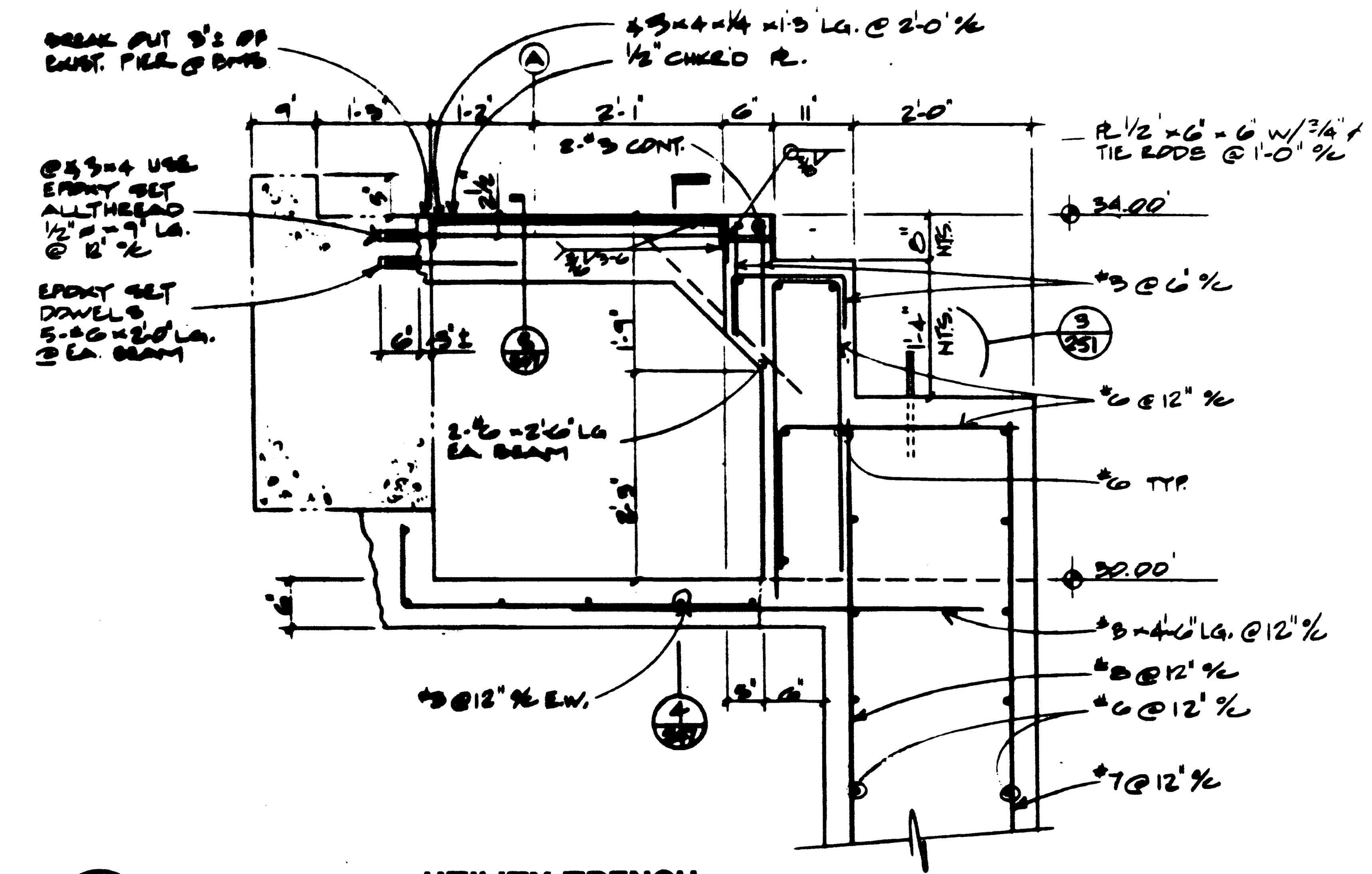
DRAWING
**233**
2

WERNER S. STORCH & ASSOCIATES, INC.
CODE 470-111
CONSULTING ENGINEERS
PORTLAND, OREGON SALEM, OREGON
D2213



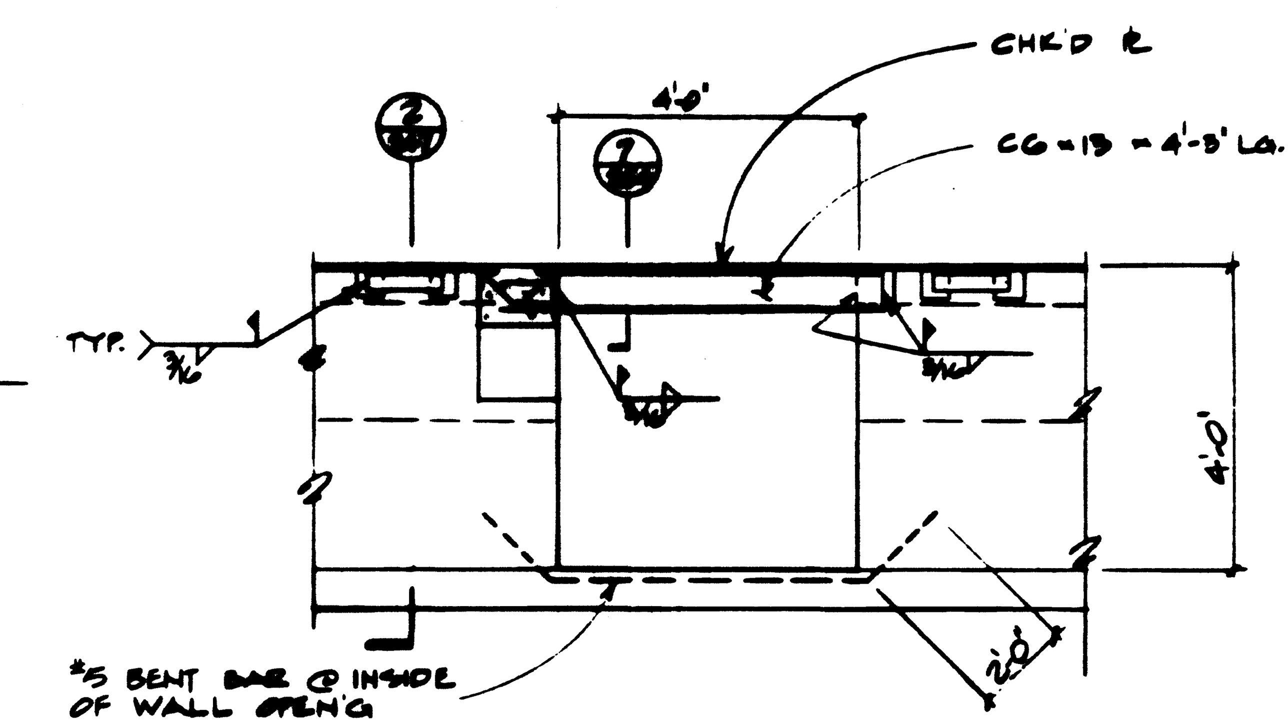

1/247 **PIT SECTION AT #5 MOLD**

1/4" = 1'-0"



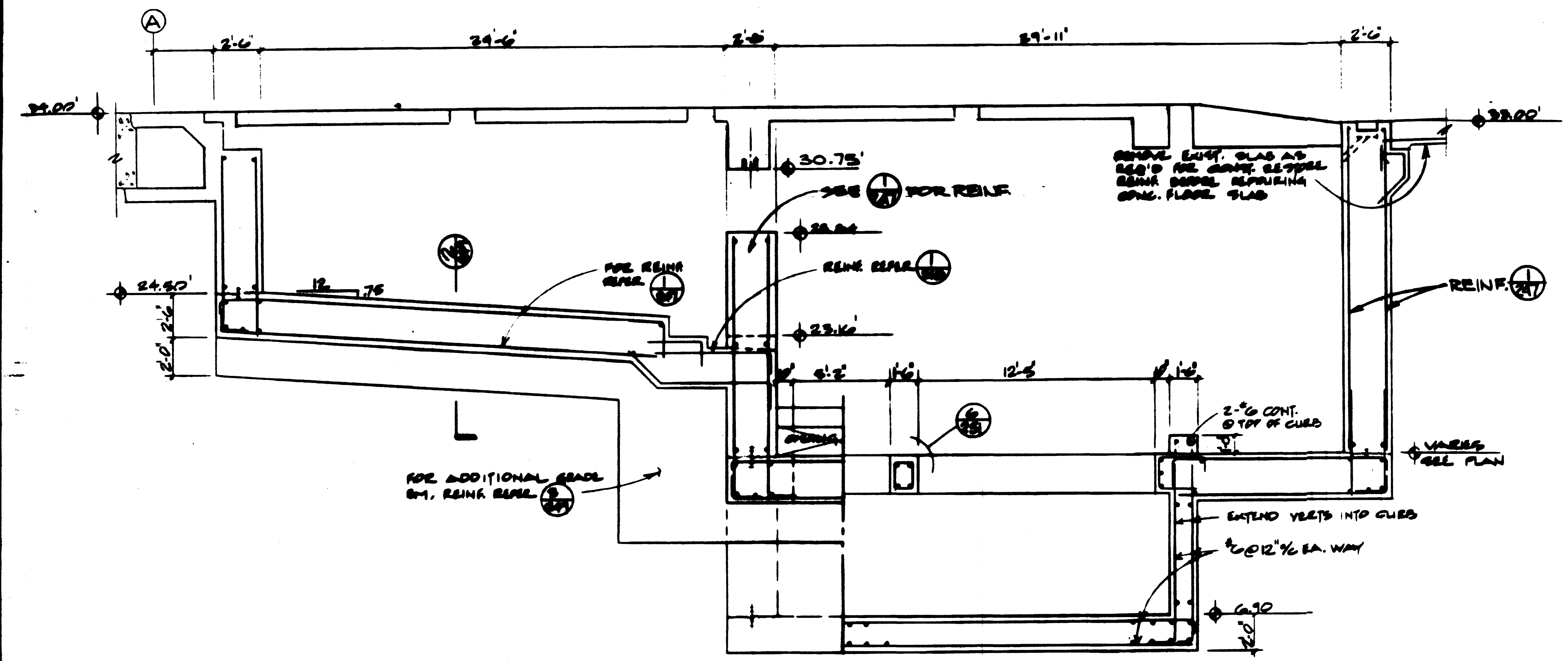

2/247 **UTILITY TRENCH**

3/4" = 1'-0"



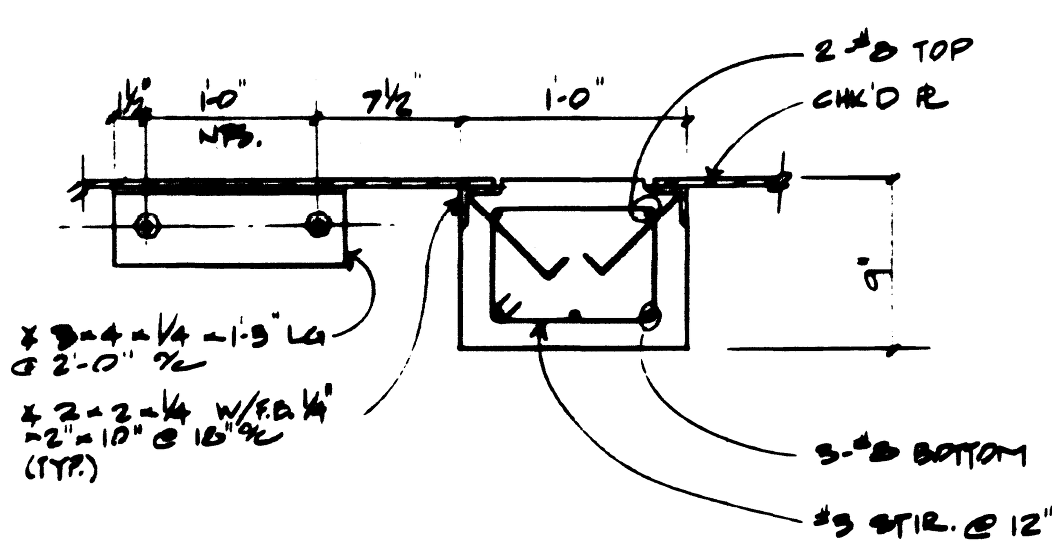

4/247 **UTILITY TRENCH FRAMING**

1/2" = 1'-0"




3/247 **PIT SECTION AT SUMP**

1/4" = 1'-0"




5/247 **SECTION AT UTILITY TRENCH**

1 1/2" = 1'-0"

CODE 470-111

OSM OREGON STEEL MILLS

PORTLAND OREGON

REVISIONS

DRAWN | CHECKED | DATE 11-16-87

PROJECT TITLE:

OREGON STEEL MILLS
5th MOLD ADDITION
PORTLAND, OREGON

STORCH ENGINEERS CORPORATION PORTLAND, OREGON

DRAWING TITLE:

MOLD PIT SECTIONS AND DETAILS

JOB NO. 8041

DRAWING NO. D-13247


SPARE TRANSFORMER
SLAB CAR
STORES
ALLOY BINS
LOADING DOCK
1 TON JIB HOIST
2 TON JIB HOIST
BLOCK HEATER
FLASK LAYDOWN RACK 478-555
CLEANER COATER
NO.5 MOLD
NO.4 MOLD
NO.3 MOLD
NO.2 MOLD
NO.1 MOLD
POUR CAR
TUBE HOLD FCE. NO.1
6 TON
2 TON
CAPITOL
OPEN ROAD
ELECTRIC OFFICE
PIPE MILL MAINTENANCE
CRANE BLOCKS, ETC.
CAPITAL
LARGE STORES ITEMS
MAINTENANCE
CONCRETE SLAB
NEW BURNING BED
PLANNER STAGING AREA
#2 ICA BAGHOUSE
FAN
LUBE STORAGE (90' x 51')
GLASSIFICATION PLANT
CONSTRUCTION ELECTRICIAN (90' x 41')
ELECTRICAL MAINTENANCE FACILITY
MAIN SUBSTATION
EQUIPMENT STAGING AREA
OUTSIDE STORES PARTS DESCALE, ETC... (FENCED COMPOUND)
61'-0"
88'-0"
24'-0"
25'-1½"
23'-3¾"
24'-1¼"
NO.
DATE
REVISION
BY
APPR.
EVRAZ OREGON STEEL MILLS
OREGON STEEL PORTLAND
EVRAZ OREGON STEEL MILLS
14400 N.E. RIVERGATE BLVD.
PORTLAND, OREGON 97203
PH. (503) 240-5240
SCALE D.N.S.
DATE
DRWN. TRF
CHKD.-APPR.
MELT SHOP TO STORAGE CONVERSION MAP
CODE 411-500
DRWG. NO. D-81953
REV. 0